UNITED STATES PATENT APPLICATION

FOR

SYSTEM AND METHOD FOR A TOPOLOGY MAP RELATED TO ACCESS POINT USAGE IN A WIRELESS NETWORK

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SPECIFICATION

TITLE OF INVENTION

SYSTEM AND METHOD FOR A TOPOLOGY MAP RELATED TO ACCESS POINT USAGE IN A WIRELESS NETWORK

CROSS-REFERENCE TO RELATED APPLICATION

[0001]   This application claims priority based on provisional application serial no.

60/443,107 entitled "SYSTEM AND METHOD FOR A TOPOLOGY MAP RELATED

TO ACCESS POINT USAGE IN A WIRELESS NETWORK" by Hilton Hung, filed on

January 27, 2003--.

FIELD OF THE INVENTION

[0002]   The present invention relates to a wireless communication system.

More particularly, the present invention is related to balancing load traffic to and

from access point in a wireless data transfer.

BACKGROUND

[0003]   In some wireless networks, an access point (AP) can be coupled to a

variety of wireless network devices.   Further, the access point can be wirelessly

coupled to another access point in a bridging fashion.   Typically, when a wireless

network device moves outside the range of a first AP, the first access point

dissociates itself from the wireless network device. When the wireless network

device moves back into range of another AP, the wireless network device

associates with that second AP.

[0004]   In another case, two access point devices can have an overlapping

zone. If an access point is only within range of a first access point of the pair, the

wireless network device associates with that first AP. When the wireless network

device moves into the overlapping zone, typically the wireless network device

stays associated with the first AP. In some implementations, the access point

devices may turn the contact over to the second access point for load distribution

reasons.

[0005]   However, when the wireless network device moves directly into the

zone of the second access point without a turnover from the first access point to

the second AP, the wireless network device must reestablish the communication

with an attached network. Typically, some of the actions involved in such a

turnover include establishing contact with the second AP, reauthorization, and

rebroadcast to the rest of the network the particular details involved with the

ability to reach the mobile wireless network device through the second AP.

[0006]   As such, such a transition may disrupt the flow of information to and

from the wireless network device. The turnover from the first to the second

involves duplicative effort and leads to disruption in communication.

SUMMARY

[0007]   A method for wirelessly transmitting data under a wireless protocol

is contemplated. An access point topology map is constructed or input. The

topology map relates access points that have overlapping coverage areas, and thus,

are prone to have remote devices travel between them. The relationships are used

to send session parameters regarding a particular wireless device to the access

points or gateways that border the zone in which the particular device is presently

in. In this manner, information regarding the particular wireless device and open

sessions may be present at such gateways or access points if and when the wireless

device enters the zone that the gateway or access point is responsible for.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]   The accompanying drawings, which are incorporated into and

constitute a part of this specification, illustrate one or more embodiments of the

present invention and, together with the detailed description, serve to explain the

principles and implementations of the invention.

Figure 1 is a network diagram of a wireless network with an access point

topology map, according to the invention.

Figure 2 is a diagram detailing an exemplary embodiment of the topology

information of Figure 1.

DETAILED DESCRIPTION

[0009]   Embodiments of the present invention are described herein in the

context of a System And Method For A Topology Map Related To Access Point

Usage In A Wireless Network. Those of ordinary skill in the art will realize that

the following detailed description of the present invention is illustrative only and

is not intended to be in any way limiting. Other embodiments of the present

invention will readily suggest themselves to such skilled persons having the

benefit of this disclosure. Reference will now be made in detail to

implementations of the present invention as illustrated in the accompanying

drawings. The same reference indicators will be used throughout the drawings

and the following detailed description to refer to the same or like parts.

[0010]   In the interest of clarity, not all of the routine features of the

implementations described herein are shown and described. It will, of course, be

appreciated that in the development of any such actual implementation, numerous

implementation-specific decisions must be made in order to achieve the

developer's specific goals, such as compliance with application- and business-

related constraints, and that these specific goals will vary from one

implementation to another and from one developer to another. Moreover, it will

be appreciated that such a development effort might be complex and time-

consuming, but would nevertheless be a routine undertaking of engineering for

those of ordinary skill in the art having the benefit of this disclosure.

[0011]   In accordance with the present invention, the components, process

steps, and/or data structures may be implemented using various types of digital

systems, including hardware, software, or any combination thereof. In addition,

those of ordinary skill in the art will recognize that devices of a less general

purpose nature, such as hardwired devices, field programmable gate arrays

(FPGAs), application specific integrated circuits (ASICs), or the like, may also be

used without departing from the scope and spirit of the inventive concepts

disclosed herein.

[0012]   Figure 1 is a network diagram of a wireless network with an access

point topology map, according to the invention. In this case, wireless network 10

contains a wireless network device 12, access points 14, 16, 20, 22, and 24. The

access points 14, 16, 20, 22, and 24 are coupled to a wired network 18. The zones

of access points 20, 22, and 24 overlap to at least some extent.

[0013]   The wireless protocol in the described example is one running under

the 802.11 protocol. However, this specification should be read to include any

wireless protocol implementing the ability to access mobile network devices.

[0014]   At some time, the wireless network device 12 comes into contact

with the access point 20. The wireless network device 12 and the access point 20

perform all the interactions necessary for the wireless network device 12 to

communicate on the network 10.

[0015]   At some level, a device contains access point topology relationship data. In Figure 1, this topology relationship is contained in a device 26. The device 26 makes the access point topology information available to all devices on the network 10. It should be noted that the device 26 is any device capable of storing and transmitting the topology information to other points on the network 10. The device 26 can be, for example, an attached computer, router, server, or gateway, to name a few.

[0016]   The access point topology relationship data is disseminated to the devices in the network. Accordingly, the various devices coupled to the network, including those responsible for administering the access points 20, 22, and 24 know the overlapping relationship of the access points 20, 22, and 24. In this example, the access points 20 and 22 share a common server or router 28, while the access point is coupled to a different server or router 30.

[0017]   In this manner, the information available on the operational characteristics and parameters of the state of the wireless network device 12, including authorization information to the network, is disseminated to the gateway 28, the gateway 30, the access point 24, the access point 20, and the access point 22.   Accordingly, since the wireless network device 12 initiated the session at the access point 24, the topology information allows the network to disseminate such information to any device that may have contact with the wireless network device 12 as it moves about. Since the access point 22 and the access point 20

overlap with the zone covered by the access point 24, the information on the

session or sessions occurring on or that are associated with the wireless network

device 12, or information on authorization or the like is promulgated to the access

point 22 and the access point 20. Since the access point 22 is coupled to a

different device on the wired network than the access point 24, namely gateway

28, such information is made available to the gateway 30 as well.

[0018]   In this manner, should the wireless network device 12 move into a

different zone of coverage, the move may occur in a seamless manner. This is

since the information associated with the wireless network device is already there.

Accordingly, the move into a different coverage area does not entail duplicative

action or reauthorization steps.

[0019]   It should be noted that any geometry of network may be used with

the topology map. Further, the gateways 28 and 30 may also be replaced by

wireless devices themselves.

[0020]   The topology information may be derived by various methods. A

network administrator may input the topology information. Or, the traffic patterns

may be monitored and the topology may be derived by the traffic data itself.

Additionally, the traffic data may be used in a probabilistic manner as well.

[0021]   Figure 2 is a diagram detailing an exemplary embodiment of the

topology information of Figure 1. The entries allow the overlapping areas to be

defined on an access point basis in this embodiment. However, it should be noted

that this is not the only manner in which the topology information may be stored and used in the context of this specification.

[0022]   In the example of Figure 2, assume that a wireless network device first initiates contact with the access point 24. In this manner, the appropriate information is passed to access point 22, as well as the gateway 28 that services the access point 22.

[0023]   The information associated with the wireless network device 12 is also forwarded to the access point 20. Of course, the relationships of the various access point units and the devices that operate with them can be stored and used to promote seamless connections for mobile devices that access them, as shown in Figure 2.

[0024]   The topology relationships may be input by an administrator, or derived from usage of the network itself. In terms of deriving the relationships, the network is adapted to track the wireless devices. When the wireless device changes zones, a record of the origination and destination zone may be recorded. In this manner, the proximity of the zones may be derived simply by the record of the devices changing zones over time.

[0025]   This concept can be extended to marking relationships where zones do not overlap, but are in proximity. In this case, the difference in time between the contact in one zone and in another may be used to determine is zones are close, but not overlapping. This relationship may also be used much as described above,

since the proximity of the zone may be used to allow proximate access points and

gateways that are not overlapping to receive the same type of information as

described above.

[0026]   Thus, a System And Method For A Topology Map Related To

Access Point Usage In A Wireless Network is described and illustrated. Those

skilled in the art will recognize that many modifications and variations of the

present invention are possible without departing from the invention. Of course,

the various features depicted in each of the Figures and the accompanying text

may be combined together. Accordingly, it should be clearly understood that the

present invention is not intended to be limited by the particular features

specifically described and illustrated in the drawings, but the concept of the

present invention is to be measured by the scope of the appended claims. It should

be understood that various changes, substitutions, and alterations could be made

hereto without departing from the spirit and scope of the invention as described by

the appended claims that follow.

[0027]   While embodiments and applications of this invention have been

shown and described, it would be apparent to those skilled in the art having the

benefit of this disclosure that many more modifications than mentioned above are

possible without departing from the inventive concepts herein. The invention,

therefore, is not to be restricted except in the spirit of the appended claims.